

Building a “Mästermyr” Style Chest



The Tool Chest from Mästermyr, Gotland, (SHM 21592)

Illustration from:

<http://www.historiska.se/collections/treasures/viking/verktyg-e.html>

Drawings, design and construction notes by
Gille MacDhnuill, Shire of Abhainn Ciach Ghlais

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whutchis@bucknell.edu

Introduction and Historical Notes

The “Mästermyr” chest (shown on the cover of this handout, along with its contents at time of discovery) is one of a class of 6-board chests that were used by Scandinavians for a variety of small storage requirements. Other chests of the same type were found in the Oseberg ship burial (see Figure 1 and Figure 2). These chests are characterized by angled end boards with an inset base. These end boards are set with the grain running vertically, and have notches cut out of their top two thirds to accept rebated (or rabbetted) tabs from the side boards. The sides are rabbetted along the bottom to better interlock with the base. The lid of the Mästermyr chest was curved on top, and hollowed out inside. The lid of the Oseberg chest shown in Figure 2 is flat. The Mästermyr lid was attached with 2 hinges of a simple hook-and-loop type, and was closed with two hasps that fastened with a sliding lock. The joints were reinforced with wooden dowels. A drawing of the chest from “The Mästermyr Find”[Arwidsson and Berg, 1983] is shown below in Figure 3.



Figure 1 – One of the Oseberg ship chests



Figure 2 – A second Oseberg ship chest

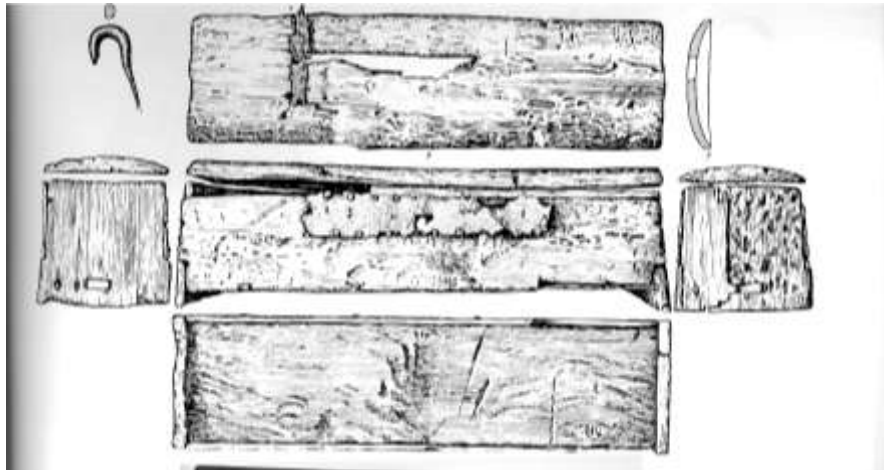


Figure 3 - Sketch of the Mästermyr chest

The Mästermyr chest was found in 1936 in Gotland, Sweden by a farmer plowing a field. The chest contained an assortment of blacksmithing and woodworking tools and materials. The chest was wrapped with a short length of iron chain, and some household goods were found nearby [Arwidsson and Berg, 1983]. The chest is damaged, and the built-in lock is heavily corroded and may be missing parts. It's unclear when and under what circumstances the chest was abandoned (or hidden). It's also unclear who owned the chest and why the tools found with it were stored in a chest of this size. Fortunately, the chest is relatively well preserved, and has been scrupulously documented by Swedish and Norwegian archeologists.

Building the chest

What's described in this handout is one possible procedure for construction of a Mästermyr-style chest. After building several of these chests, I believe this procedure will produce a final product with tight-fitting joints and a minimum of "fussing." Make sure you complete each step before measuring and marking the next part. Mark lines for cutting with a marking knife or mortise gauge to prevent chip-out (see Figure 4 for a great example)



Figure 4 - Tear out stopped by scribe line

Construction Notes

Tools

The more specialized tools you have, the easier it is to complete any woodworking project. In this case, a Mästermyr-style chest can be completed with only hand tools -- after all, there were no power tools in the 10th century. By far the most valuable power tool to have to complete this project is a table saw. It will allow you to rip all your boards to the proper width, miter the ends to the correct angle and, with a dado attachment, cut all the rabbets. If you don't have access to a table saw, the rip and miter cuts can be done by hand and the rabbets cut with a chisel (very difficult) or with a specialized plane. The second most useful power tool for this project would be a power miter saw. The miter saw can cut each board to length, and cut the end angles easily and accurately. It can also be adjusted to cut the end rabbets in the sides. Other power tools that would be useful include a band saw (to cut tenons and notches), a drill press (to drill the holes for dowels and remove material for the mortises) and a power planer (to prepare the wood from rough lumber, and to clean up board edges)

If you want to eschew power tools and the "New Yankee Workshop" scene, you'll need good handsaws for both crosscutting and ripping plus planes for cutting the rabbets and smoothing the board edges. In any case, you'll need at least one chisel for cutting or cleaning up the mortises in the ends. As I describe the pieces and the construction process, I'll note which tools I used.

Base (see construction diagram 1)

To begin, determine the basic dimensions of the chest you want to construct. The depth and width will determine the size of the base of the chest, which is where you'll start. You'll also need to know the thickness of the material you'll be using. The base (see Figure 5) is a rectangle with 2 protruding tusk tenons. The overall width of your chest will be the width of the base plus one times the thickness of the side material. The length of the chest will be the length of the base, measured to the outside of the tenons.

The base size can be any arbitrary length and width, and should be the first piece cut. Cut a board to the right length, and then rip it to the correct width. The long edges of the board should be smooth, flat and square. Either touch them up on a planer, or square them with a bench plane. The tenons should be about an 1/8" longer than one half the thickness of your material. For standard one-by lumber (which is actually only 3/4" thick) this would be 5/8." The width of the tenon should be about one fifth the width of the base, unless your base is very wide, in which case you may want to make the tenon a smaller fraction of the width.



Figure 5 - Completed base in pine

Cut out the tenons with a hand saw or a band saw, making the shoulder cuts as square as possible. Clean up the outer end-grain of the tenon, as it will be visible on the completed chest. The “shoulder” of the tenon should be square, but doesn’t need to be particularly smooth as it will be hidden inside a mortise.

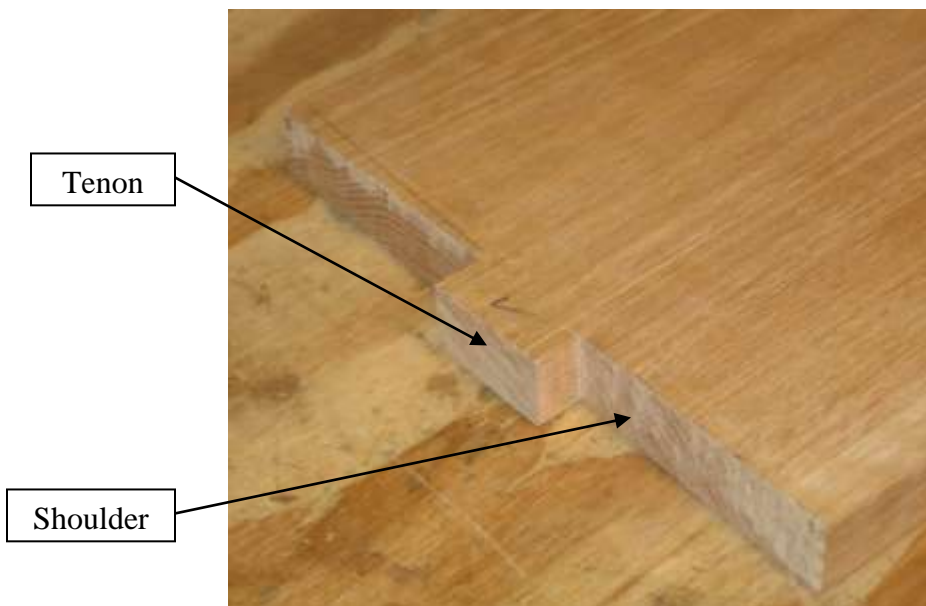


Figure 6 - The tenon and shoulder in oak

Ends (See construction diagram 2)

Based on the width of your base and your desired chest height, you can cut out the end pieces (see Figure 7). The width of the ends is the width of your base plus one times the thickness of your material. Don't forget that the grain of the wood for the ends runs up and down. Just cut the pieces to their overall size now – don't bother cutting the notches at the top yet, as you want to be sure you have the mortises cut correctly before doing any additional work on the ends. Mark a line on the inside of the ends, up from the bottom, to the height where you'd like the "legs" on the chest to start. The leg height on the original "Mästermyr" chest was $1\frac{1}{8}$ inches for a $9\frac{1}{8}$ inch overall height. Line up the end of the base tenon with this line, and center it left-to-right. Mark the outside edges of the tenon on the inside of the end with a marking knife.

You'll need to cut the mortises at the same angle as the ends of the chest slant in. On the original "Mästermyr" chest, this angle is about 5 degrees. Drill out the inside of the mortise at the correct angle, and clean up the corners with a chisel. Fit the tenon in the mortise, and check the angle. When you have a snug fit, and the shoulder of the base is tight against the inside of the end, mark the perimeter of the base with the marking knife. Now would be a good time to mark the two ends and the base so you'll always put them back together the same way. The mortise and tenon, if cut by hand, will be something of a "custom" fit.



Figure 7 - Chest end in pine

Drill and chisel out the housing slot for the base. It should be about $\frac{1}{2}$ the thickness of the end at its deepest point. It will be somewhat shallower along the upper edge due to the angle of the cut. Keeping the edge clean is more important than making sure the bottom of the slot is perfect. Dry fit the base and check to see that the angle of the ends is correct. Remove material gradually until the angles are correct.



Figure 8 - Angle of housing slot for base



Figure 9 - Angled housing slot in end in oak. Note the marks from the drill bit that was used to rough out the slot.

Sides (See construction diagram 3)

Once the end mortises are done and your satisfied with the fit, we can now measure, mark and cut the side pieces. Fit the ends onto the base, and lay the sub-assembly onto a board for the side pieces. Align a finished edge of a side piece with the bottom of the base, and mark the outside of the ends. If you have access to a miter saw, either powered or manual, you can use it here to cut the end angles of the side boards to your desired angle (5° in this case). Match the cuts as closely as possible to the marked lines, making sure you don't cut the sides too short. Also make sure the side is slightly taller than the end boards so there's enough material to plane the top flush after assembly.



Figure 10 - Fit the ends into the base, and check the angle before marking the sides. Note that this photo was taken before the housing slot was cut.



Figure 11 - Ends and base assembled prior to marking

After cutting the side boards, you need to go back to the end boards and cut out the notches at the top. On the original Mästermyr chest, the ratio between the notched and uncut portions of the end was 1.6 to 1. So, take your total height, and divide it by 2.6. That will give you the height of the uncut portion at the bottom of the end piece. Cut out a notch from the upper sides of the end that is the remaining distance (uncut height times 1.6) long and $\frac{1}{3}$ the thickness of the side boards wide. In the original



Figure 12 - Side board in pine showing both rabbets

Mästermyr chest, the total height of the end piece was approximately $9 \frac{1}{8}$ inches. The height of the notch that was cut out for the sides was $5 \frac{5}{8}$ inches, leaving $3 \frac{1}{2}$ inches uncut at the base. The wood for the sides of the original chest was about $\frac{3}{4}$ inches, and the notch was about $\frac{1}{4}$ inch wide. Cut the notch either with a hand saw, band saw, or table saw. This is part of the visible joinery on the chest, and any irregularities in the cut will be very noticeable. If you have a rabbet or chisel plane, you can cut the notch a little small, and plane it out to the final dimension.

Once all 4 notches are cut, line up the sides with the end and base, and mark the dividing line. Cut out the notches in the sides the same way as you did the ends. Once the notches on the sides are cut and aligned, mark the depth of rabbet needed on the end-grain of the tabs. See () for an illustration of this. Cut this rabbet out with either a dado blade on the table saw, or by hand with a rabbet plane. This is the last cut for the seam between the ends and sides, so check your fit often.

After all the end/side joints are done, mark the bottom of the sides for the last rabbet joint. You'll want to mark the face grain the full thickness of the base board, and mark the edge grain $\frac{1}{2}$ the thickness of the side board. Cut this rabbet either with your dado blade on a table saw, or with the rabbet plane. Although this seam isn't visible unless you turn the chest upside-down, it is an important glue joint. Take your time and get a tight-fitting joint.



Figure 13 - Finished side piece

Lid and Assembly

At this point, you should be able to dry-fit all the pieces of the chest together. It should almost hold together without glue or fasteners. Use a block or hand plane to clean up any of the tabs that are proud of the adjacent surface. With the sides and ends together, invert the box, and mark the dimensions for the lid on a piece of stock one and half to two times the thickness of the side/end material. If you don't want to bother with a curved and dug out lid, you can use a board the same thickness as the remainder of the chest. Cut out the lid. I think digging out the hollow side is easier to do first. You can do it with a router or by hand with an adz, scorp and gouge. Once you're happy with the finish inside the lid, you can shape the outside with a power planer or jack plane. Make sure to leave enough material so the edge of the lid is about $\frac{1}{2}$ the thickness of the side boards.

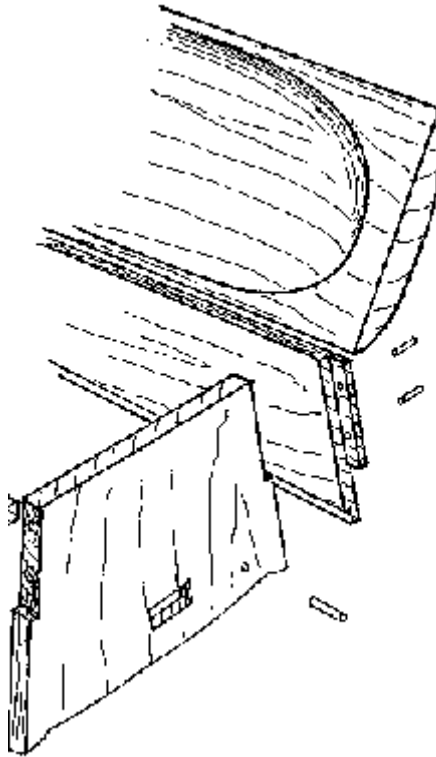


Figure 14 – Sketch of assembly, including the lid.

Ok, all the pieces are cut and all the joinery is done. At this point, you should make or select your hardware, and make sure the hinges and hasps fit properly on the chest. Adding a proper “Mästermyr” lock will involve cutting out some of the material from the front of the chest to make room for the lock mechanism. Whatever you decide to do, finish all the cutting and shaping before going on to glue up.

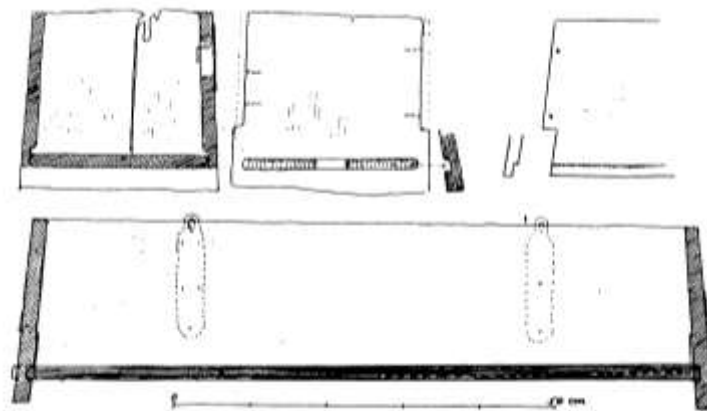


Figure 15 - Drawing of original chest, showing assembly details.

With all the rabbeting and notching on this chest, I think it was intended to be glued together. Period glues would have been hide or fish based, and both can be found

today. Any number of modern adhesives can be used to provide superior weather-proofing. Due to the puzzle-like nature of the chest, all the seams need to be glued up at once. Buy or borrow at least 6 quality clamps to apply pressure to the joints as the glue dries. After gluing, drill holes for the dowels. The original chest had dowels approximately every 8 inches along the bottom, with 2 dowels each on the side and end tabs. Try to drill as perpendicular as possible to the sides of the box. This is where a drill press or drill guide comes in very handy. Since the end grain of the dowels will be visible after the chest is completed, choose a complementary wood. Don't use the grooved or spiral dowels for this application, as they will always show gaps. Drill holes the same size as the dowels -- they will always come out slightly undersized. Put a small amount of glue in the holes, and tap the dowels in place. After the glue has dried, cut the dowels off flush to the surface with a fine-toothed saw or pare them with a chisel.

After glue-up, use a plane or chisel to make the top surfaces of the box flush and level. Be careful planing down the sides, as the wood at the end may tend to chip out. Plane the corners in towards the center of the chest. If you want, you could also plane the bottom of the ends (the feet) so they are flat and level.

Finishing and sealing is entirely up to you and the end user of the chest. There are a variety of period stains and finishes that can be applied, or a near infinite number of modern finishes. Any carving, wood burning, or painting should be done before any finish is applied. Finish the chest, then apply the hardware. Time to start on the next one!

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